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DISEASES OF ROSES CAUSED BY NEMATODES

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In Florida, at least 30 species of plant parasitic nematodes have been recovered from soil around rose roots (6, and unpublished Bureau of Nematology records, Fla. Dept. Agric. & Consumer Services, Division of Plant Industry, Gainesville, FL). The extent of damage that most of these nematodes cause on roses has not been determined; however, studies have shown that at least four types of nematodes are capable of causing diseases on roses. Most easily recognized, are diseases caused by root-knot and dagger nematodes that cause swelling or galls on roots. Lesion nematodes are also known to cause poor growth and serious decline of roses, but often are overlooked because they do not cause easily recognized symptoms such as galls, and as most plant parasitic nematodes, they can only be observed microscopically.

Fig. 1. Influence of Pratylenchus vulnus on the growth of Rosa noisettiana 'Manetti' 4 months after inoculation. Left: no nematodes; right: 10,000 nematodes per pot. Photo: courtesy of G. S. Santo.

Root-knot nematodes: Meloidogyne hapla Chitwood, causes small galls on the roots of roses and is widely distributed in the United States where roses are grown commercially in greenhouses (2,7). Histological studies of rose roots infected with M. hapla indicate that gall and giant cell formation is similar to that observed on other plants (2). Symptoms such as stunting and decline of plants have been associated with Meloidogyne sp. on roses in Florida, but extent of damage by the root-knot species that occur most frequently on roses has not been evaluated.

Dagger nematodes: Xiphinema diversicaudatum (Micoletzky) Thorne, causes a distinct galling of the smaller roots of roses. Gall formation is due primarily to an increase in the number and size of cortical cells (2). Relatively low numbers of this nematode on roses may result in poor growth of rose. In greenhouse studies, 12 X. diversicaudatum per liter of soil caused reduction of root fresh weights and stem and leaf dry weights of Rosa canina L. (11). Another species of dagger nematode, X. brevicolle Lordello & da Costa, has been shown to be pathogenic to rose. After 6 months, rose plants, R. indica L., inoculated with 1,000 X. brevicolle, weighed 38% less than noninoculated plants (1).

Lesion nematodes: More than any other group of nematodes, lesion nematodes have been frequently associated with decline of rose in many regions of the world. Pratylenchus vulnus Allen & Jensen, is widely distributed in commercial rose production regions throughout the world (7,8,11). Infected plants are stunted and chlorotic. Leaves from plants infected with P. vulnus are lower in iron, copper, and potassium than leaves from control plants (8). Root systems are often necrotic and have fewer feeder roots than noninfected plants (Fig.1) (7,9). High populations of this nematode reduce flower production. Plant longevity is also reduced and represents additional loss to the grower (11). This nematode has been shown to be pathogenic on a number of different root stocks, i.e., Rosa sp. 'Dr. Huey', R. canina, R. noisettiana Thory 'Manetti', and R. odorata (Andr.) Sweet. Stunting of plants was correlated with the number of nematodes added (7,11). R. chinensis Jacq. and R. multiflora Thunb. ex J. Murr., are less suitable root stocks for P. vulnus. In Florida, P. penetrans Cobb causes appreciable injury to roses grafted on R. x fortuniana Lindl. rootstock (4).

Needle Nematodes: Longidorus macrosoma Hooper greatly depressed the growth and yield of commercially-grown greenhouse roses in the United Kingdom. High numbers of this nematode reduced the size and quality of blooms, and stems were much shorter than normal (10).

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Control: Because post-plant nematicides for roses are not registered for homeowner use, a primary consideration for control of nematodes is preparation of the planting site and sanitation. The use of sodium methyldithiocarbamate (Vapam), 2 to 3 weeks before planting, initially should control nematode populations as well as some weeds and diseases. When new roses are planted, it is also important to avoid re-introducing any of the types of nematodes known to cause disease. An examination of root systems for galls and lesions, before plants are purchased, could, in some cases, indicate that nematodes might be present; however, a laboratory analysis for nematodes would provide more reliable information on the presence of nematodes that may have potential to cause disease.

In sandy soils in Florida, mulching consistently results in improved growth and flower production. Although specific experiments have not been conducted to evaluate the effects of mulching on nematode populations on rose, research on other crops indicates it is probable that increasing organic matter in the soil around the base of the plant will reduce nematode populations (3).

Although rootstocks vary in host-suitability for various species of pathogenic nematodes, rootstocks that are regionally adapted and resistant to a broad spectrum of pathogenic nematodes have not been developed at present. In Florida, the R. x fortuniana has been observed to have fewer root-knot nematode problems than many other rootstocks, and is considered to have broad spectrum adaptability and longevity for growing conditions in subtropical regions (5).

Commercial growers can control nematodes best through sanitation practices. If nematode problems develop due to improper sanitation practices or other reasons, several nematicides are registered for commercial use on roses.

Survey and Detection: Typical aboveground symptoms of nematode damage are stunting and, in severe cases, yellowing of the foliage. Roots should be examined for galls and abnormal discoloration. A sample consisting of approximately one quart of soil and roots should be submitted to a nematology laboratory, if a nematode problem is suspected.

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